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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/666,331	09/17/2003	Hong Shih	LMRX-P023/P1130	8374

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IPSG, P.C.
P.O. BOX 700640
SAN JOSE, CA 95170-0640

EXAMINER	
KORNAKOV, MICHAIL	
ART UNIT	**PAPER NUMBER**
1746	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/12/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/666,331	SHIH ET AL.	
	Examiner	Art Unit	
	Michael Kornakov	1746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133): Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 February 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-44 and 46-58* is/are pending in the application.

4a) Of the above claim(s) *34-37 and 55-58* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-33,38-44 and 46-54* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 September 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *07/19/05,04/28/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Applicants' summary of the telephonic interview, dated 02/28/2007 is acknowledged. Applicants' proposal to cancel claim 45 and to correct claims 39 and 50 is well taken. It is understood that claim 39 should recite third solution and claim 50 should recite fifth solution. However, Applicants are advised to correct the indicated claims in response to this office action. With regard to election of species, applicants' election of claims 30-33 is acknowledged. The requirement to elect species recited by claims 7 or 8 and claims 21 or 22 or 29 is withdrawn. Therefore, claims 34-37, as well as claims 55-58 are currently withdrawn from consideration as being drawn to non-elected inventions.

2. Claims 1-33, 38-44, 46-54 are currently examined on the merits.

Specification

3. The disclosure is objected to because of the following informalities:

- Paragraph 0037 recites "keytone". Apparently, ketone is indicated.

Paragraph 0042 recites "the weak **acidic solution** comprises . . .the **solution**", which is not readily ascertainable.

4. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o).

Claim 22 recites "The method of claim 2, wherein said second solution comprises H_2O_2". While providing for treatment with second solution including a ketone reagent,

such as acetone (0016, 0037), the instant disclosure apparently does not provide for the processing step, wherein the second solution, also includes hydrogen peroxide (H_2O_2).

Claims 23-25 recite variety of concentrations of H_2O_2 in the second solution, which is not disclosed by the instant disclosure.

Claim 29 recites "The method of claim 2, wherein said third solution comprises H_2O_2". While providing for the presence of water (H_2O), the instant disclosure apparently does not provide for the processing step, wherein the third solution having a set of acids, also includes hydrogen peroxide (H_2O_2).

Appropriate clarification/correction is therefore required.

Claim Objections

5. Claims 1, 27 are objected to because of the following informalities: claims 1, 27 recite "keytone". Apparently, ketone is indicated.

Appropriate clarification/correction is required.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claims 40-44 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for acetic acid as a component of the acidic solution, does not reasonably provide enablement for a set of acids comprising acetic acid. The

specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to practice the invention commensurate in scope with these claims.

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 12, 15, 18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

10. Claim 12 recites the limitation ""said step of removing said set of structures from said third solution". There is insufficient antecedent basis for this limitation in the claim.

11. Claim 15 recites the limitation ""said step of removing said set of structures from said forth solution". There is insufficient antecedent basis for this limitation in the claim.

12. Claim 18 recites the limitation ""said step of removing said set of structures from said fifth solution". There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

14. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

15. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

16. Claims 1-21, 26-33, 38, 39, 44, 46-54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shih et al (U.S. 20030190870) in view of Han et al (U.S. 6,942,929) and in further view of Collins et al (U.S. 6,814,814).

Shih teaches cleaning ceramic surfaces of parts used in semiconductor processing equipment. The teaching of Shih includes treating the parts with oxidizing solution including H_2O_2 (0015 or 0032) (reads on "a first solution", as claimed; treating the parts with acetone and a brush (0032) (reads on "a second solution", as claimed;

treating the parts with a first set of acids, including HF (0033) (reads on "a third solution", as claimed).

Shih does not specifically indicate that ceramic surfaces include yttrium oxide, as recited in the preamble of the instant claim 1. However, a preamble is generally not accorded any patentable weight where it merely recites the purpose of a process, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone, consult ***In re Hirao***, 535 F.2d 67, 190 USPQ 15 (CCPA 1976). Besides, it is noted that chamber parts are conventionally covered with ceramic coating of yttrium oxide in order to better protect the chamber parts from corrosion, as evidenced by Han (col. 1, lines 35-40; col.4, lines 43-50). Therefore, the presence of ceramic having yttrium oxide is reasonably expected within the teaching of Shih.

Shih also remains silent about mechanically rubbing a surface of the part while treating it with the first set of acids (third solution). However, scrubbing or rubbing or wiping chamber surfaces during wet cleaning is conventionally utilized in the art, as indicated by, for example by Collins, who teaches that "residues are periodically cleaned off the chamber surfaces to reduce or prevent contamination of the substrate. The chamber may be cleaned by a wet-cleaning process in which the chamber is shut down and an operator scrubs or wipes the chamber walls with an acid or solvent" (col. 1, lines 27-35). Therefore, one skilled in the art motivated by the general teaching of Collins would have found obvious to utilize mechanical scrubbing in order to efficiently clean ceramic parts with oxidizing or acidic processing solutions in the teaching of Shih.

With regard to claim 3, abrasive pads are conventionally utilized for scrubbing and one skilled in the art would have found obvious to use such pad as the scrubbing tool in the teaching of Shih/Collins.

With regard to claims 2, Shih teaches treating parts with the second set of acids (0033) (reads on "a fourth solution", as claimed). Shih also teaches treatment with alkaline solution, which includes NH_4OH. Shih specifically indicates that treatment with NH_4OH may be useful in removing metal contaminants (0015). Shih also indicates that chemical steps in his cleaning routine may further include or be replaced with the other chemical steps depending on the nature of contaminants to be removed (0031).

With regard to claims 4-6, 8-20 Shih teaches rinsing parts with DI water and drying with filtered nitrogen upon cleaning with particular chemical (Fig. 2, Fig. 3).

With regard to claim 7, which recites cleaning set of structures ultrasonically, it is noted that ultrasonically enhanced cleaning/rinsing is conventionally utilized in the art and one skilled in the art would have found obvious to enhance cleaning of parts by applying ultrasonic waves to the acetone containing solution of Shih.

With regard to the limitations, reciting particular processing parameters, such as treatment time and concentrations of treatment solutions, Shih teaches that relative amounts of chemical ingredients and the length of time of the dip may be determined routinely by one of ordinary skill in the art (0015, 0016, 0017). Since the criticalities of recited parameters are not shown on this record, one skilled in the art would have found obvious to optimize treatment time and concentrations of treatment solutions as

suggested by Shih in order to provide efficient treatment of ceramic parts in the teaching of Shih.

With regard to claim 29, Shih teaches the use of acidic solution in combination with H_2O_2 (0031, 0033) and that the processing steps can be replaced. Therefore, presence of H_2O_2 in the first set of acids or in the third cleaning solution, as recited, is expected within the teaching of Shih.

17. Claims 40-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shih et al (U.S. 20030190870) in view of Han et al (U.S. 6,942,929), in view of Collins et al (U.S. 6,814,814) and in further view of Amai et al (U.S.7,063,094).

Shih teaches the use of HNO_3 in the second set of acids. Shih remains silent about the use of CH_3COOH in the second set of acids. Amai teaches that foreign substances on the interior surfaces of the chamber can be dissolved by nitric or acetic acid, thus recognizing equivalency between nitric and acetic acid for similar purposes. However, substitution of equivalent methods requires no express motivation, as long as the prior art recognizes equivalency, ***In re Fount*** 213 USPQ 532 (CCPA 1982); ***In re Siebentritt*** 152 USPQ 618 (CCPA 1967); ***Graver Tank & Mfg. Co. Inc. V. Linde Air products Co***. 85 USPQ 328 (USSC 1950). With regard to particular concentration of acetic acid in the second set of acids, since the criticality of recited concentrations is not shown on this record, one skilled in the art would have found obvious to optimize such concentrations in order to provide efficient treatment of ceramic parts in the teaching of Shih.

18. Claims 22-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shih et al (U.S. 20030190870) in view of Han et al (U.S. 6,942,929), in further view of Collins et al (U.S. 6,814,814) and in view of Chen et al (U.S. 6,162,738) and Yu (U.S. 6,514,875).

While teaching treatment of parts with acetone (second solution, as claimed), Shih remains silent about acetone solution comprising H_2O_2. It is noted that the instant specification does not disclose the processing step, wherein such solution is applied. Nevertheless, since the use of acetone for the removal of organic contaminations is known in the industry, as indicated, for example by Yu (col.2, lines 41-43) and since the use of H_2O_2 for the removal of organic contaminants is also known in the industry, as indicated, for example, by Chen (col.7, lines 33-37), one skilled in the art would have found obvious to add H_2O_2 to acetone containing solution of Shih since it is prima facie obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition to be used for the very same purpose. Consult ***In re Kerkhoven***, 626 F.2d 846, 850, 205 USPQ 1069, 1072 (CCPA 1980) See also ***In re Crockett***, 279 F.2d 274, 126 USPQ 186 (CCPA 1960) and ***Ex parte Quadranti***, 25 USPQ2d 1071 (Bd. Pat. App. & Inter. 1992).

Conclusion

19. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Morgan (U.S. 6,905,974) teaches cleaning semiconductor processing equipment with ketone peroxides (col.2, lines 62-67).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Kornakov whose telephone number is (571) 272-1303. The examiner can normally be reached on 9:00am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr can be reached on (571) 272-1414. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

M. Kornakov

Michael Kornakov
Primary Examiner
Art Unit 1746

03/05/07